family Cassididæ.[4] Many larvæ of these beetles have peculiar lateral expansions of the body, and a long spiny or bristly tail, which accumulates excrement and cast-skins, and is recurved over the body. When disturbed the larvæ erect and wave these tails. He concludes that these structures are used principally as a protection against parasitic enemies. The eggs are enclosed in a case, frequently one in each case, and these cases are often covered with excrement.

Mr. H. S. Smith has published a most useful work on the Hymenoptera of Nebraska,[5] a synoptic and descriptive catalogue of the Sphegoidea of that state. There are tables to the genera and species, and descriptions of fifteen new forms; altogether over 200 species are recorded from the state. It is hoped that some eastern hymenopterists will follow the example.

Professor E. B. Poulton has published a detailed museum study of our butterflies of the genus *Limenitis*,[6] tending to show the influence of *Anosia plexippus* and *Danaida berenice* upon *L. archippus*, and its varieties. He also considers that *L. californica* is the model of *L. lorquini*. Although he brings out many interesting points about coloration and pattern, one can not fail to notice the paucity of field observations which alone are of determining importance in these matters. The author considers that *Papilio philenor* is mimicked by three other species of the genus —*P. troilus*, *P. asterius* (female) and *P. glaucus* (female), which would hardly be suspected by any one familiar with these butterflies in the field.

Mr. W. Lundbeck has published the second part of his book on Danish diptera.[7] As with the preceding part, this is a most excellent treatment of the subject. The structural characters are given in great detail; there is a good account of habits and life-history; and under the Asilidæ are numerous records of their prey, showing that there is no mimicry of their prey by these ferocious flies. Although the species known from Denmark are very few, the author's treatment of the genera and families is so full as to make the work a most useful one to the American dipterist.

Attention should also be called to the recent catalogue of Argentine Diptera by Dr. J. Brèthes.[8] He lists the flies of Argentina, Patagonia, Uruguay and Paraguay, 650 species in all; mostly in the Asilidæ and Syrphidæ. There are 23 species of mosquitoes.

Nathan Banks

[4] "Life Histories of some Philippine Cassididæ," *Phil. Journ. Sci.*, III., pp. 261–271, 6 pls. 1908.

[5] "The Sphegoidea of Nebraska," *Univ. Studies*, Vol. VIII., No. 4, October, 1908, pp. 88, 1 plate.

[6] "Mimetic North American Species of the Genus *Limenitis* and their Models," *Trans. Ent. Soc. Lond.*, 1908, pp. 447–488, 1 plate.

[7] "Diptera Danica; Genera and Species of Flies Hitherto Found in Denmark." Part II., Asilidæ, Bombylidæ, Therevidæ, Scenopinidæ. Copenhagen, 1908, pp. 162, 48 figs.

[8] "Catalogo de los Dipteros de las Republicas del Plata," *Anales Mus. Nac. Buenos Aires* (3), IX., pp. 277–305, 1908.

SPECIAL ARTICLES

CONCERNING THE EXISTENCE OF NON-NITRIFYING SOILS

It is believed by agricultural specialists as well as by bacteriologists that soils generally have the power to convert organic or ammoniacal nitrogen into nitrate nitrogen, *i. e.*, to nitrify. Nitrifying organisms are supposed to abound to such an extent that any stratum not possessing them would soon become inoculated with them by air, soil, manure, water or other means.[1]

Filter beds, originally non-nitrifying, soon become vigorous nitrifiers without inoculation; sewage nitrifies freely in running streams; nitrate as saltpeter is of almost universal natural occurrence. A surface soil which can not nitrify would be regarded as a rare anomaly, therefore, and that many such non-nitrifying soils exist, could not be expected from the generally assumed conditions.

During our work of the past few years, we have, however, been repeatedly confronted with the fact that many of our soils do not nitrify. The first evidence of the existence of non-

[1] Le Far, "Handbuch der Technischen Mykologie," III., 147.

nitrifying soils was afforded in 1903 during an attempt of one of us to demonstrate nitrification to a class in bacteriology after the usual laboratory manner.[2] The attempt resulted in a complete failure to secure nitrification. This observation was confirmed by the other at a later time while working independently with other soils. This is noted on page 14 of the report of the North Carolina Agricultural Experiment Station, 1906–7. Since that time, in connection with our studies in nitrification, many samples of soils have been tested for nitrifying power with the result that a large majority of the soils of this region are found to be devoid of this power. The numbers of the soils tested, dates, mode of test, whether in soil or in solution, and the results, are given in the following table.

The tests in solutions were made by the usual method of placing from 0.2 g. (Ashby's Method) to 5 or 10 g. of the soil to be tested into an ammoniacal solution such as that of Omelianski, Wiley or Ashby.

Tests in soil were made by adding nitrogenous material, organic or ammoniacal, to the live soil or by sterilizing the soil, adding the nitrogen, then inoculating with a suspension of the soil to be tested, incubating, shaking with water, filtering, clarifying and analyzing.

Soils which are reported here as negative did not give enough nitrate or nitrite to respond to the diphenylamine test.

SAMPLES OF LOCAL SOILS

29 per cent. nitrifiers.
71 per cent. non-nitrifiers.

LOCAL SOILS

37 per cent. nitrifiers.
63 per cent. non-nitrifiers.

It is seen that of the 62 local samples tested in soil culture, 44, or 71 per cent., failed to nitrify, 18, or only 29 per cent., nitrified; of the 40 different local soils tested 15, or 37 per cent., nitrified while 25, or 63 per cent., failed to nitrify, even though soils which sometimes nitrified slightly and sometimes failed, as Nos. 1783 and 1746, are recorded for this purpose as nitrifying soils.

[2] Buxton, B. H., *Jour. Ap. Mic.*, 5, p. 1975.

Soil	Date of Sampling	Results in:	
		Soil	Solution
1830	October 3, 1905	0	
1855	November 21, 1905	0	
1830	December 5, 1905	0	
1830	February 7, 1906	0	
Plat 12	February 26, 1906	0	
1540	September 17, 1906	0	
1540	October, 1906	0	+
1540	August 10, 1908	0	
1549	September 17, 1906	0	
1549	August 10, 1908	0	0
1667	October 31, 1907	0	0
1667	April 23, 1908	0	0
1667	August 6, 1908	0	0
1746	September 17, 1906	0	
1746	October, 1906	+	+
1746	August 10, 1908	0	0
1783	September 17, 1906	0	
1783	October, 1906	+	+
1783	August 13, 1908	0	0
1784	September 17, 1906	+	
1784	August 13, 1908	0	0
1859	November, 1906	0	
1860	November, 1906	0	
1861	November, 1906	+	
1862	November, 1906	0	
1863	November, 1906	0	
1864	November, 1906	0	
1865	November, 1906	0	
1866	January 23, 1907	+	0
1866	October 21, 1907	+	0
1867[3]	February 1, 1907	+	0
1867	October 31, 1907	+	+
1867	August 12, 1908	+	
1870	February 13, 1908	+	
1871	February 13, 1908	+	
1931	November 9, 1907	0	
1931	January 10, 1908	0	
1931	August 13, 1908	0	+
2069	February 11, 1908	+	0
2526	August 17, 1908	0	0
2527	August 17, 1908	0	0
2528	August 17, 1908	0	0
2529	August 20, 1908	0	+
2530	August 20, 1908	0	0
2531	August 20, 1908	0	+
2559	September 17, 1908	0	+
2559	October 15, 1908	0	
2560	September 17, 1908	0	+
2560	October 15, 1908	0	+
Plat 1	December, 1906	0	
" 2	December 13, 1906	0	
" 6	September 29, 1906	+	
" 7	October 29, 1906	0	
" 7	December, 1906	+	
" 9	October 10, 1906	+	
" 10	October 29, 1906	0	
" 10	October 31, 1907	0	0
" 12	September 10, 1906	+	
" 12	December, 1906	0	
" 13	September 29, 1906	0	
" 17	November 3, 1906	+	
" 17	December, 1906	+	

[3] Tested at least twelve times and never failed to nitrify but once.

These soils, with the exception of Nos. 1866, 1867, 1870 and 1871, are normal agricultural soils mostly from within a mile of the farm of the North Carolina Agricultural Experiment Station and are normally productive though not to be classed as rich soils. Nos. 1866 and 1867 are soils from the college green house. Nos. 1870 and 1871 are from commercial green houses of Raleigh.

For comparison, samples of soil were secured from New Jersey through Jacob Lipman, Washington, D. C., from Karl Kellerman, Michigan from W. S. Sayer and Wisconsin from H. L. Russell. It was requested that soils most promising as to nitrifying power be sent. It is seen from the following table that positive results were secured with each of these soils.

Soil	Date of Sampling	Results in:	
		Soil	Solutions
N. J. (H.)	September 28, 1908	+	+
N. J. (R. S.)	September 28, 1908	+	+
D. C. soil	September 28, 1908	+	+
Mich.	October 1, 1908	+	+
Wis.	October 1, 1908	+	+

The positive response of all of these soils and of our own green-house soil serves to doubly emphasize the fact that many of the soils here reported are really lacking in nitrifying power.

Further study of the quantitative results would emphasize still more the differences, since in many instances the soils which we have reported positively gave only a trifling amount of nitrate as compared with soils which are in vigorous nitrifying condition, *i. e.*, most of the soils which we report here as nitrifiers are, with the exception of Nos. 1866 and 1867, very poor nitrifiers as compared with 1866 or with the soils sent to us from distant sources.

While these data include various soils at various times of the year and under diverse climatic conditions, it is, of course, possible that some of the soils here recorded as non-nitrifiers would have induced nitrification if tested at some other time of the year; indeed there is positive evidence that in some instances soils change to a very marked extent in nitrifying power, but inasmuch as the tests here reported cover, in many instances, the period of crop production, their agricultural bearing would not be materially altered.

It is obvious that the absence of nitrifying power is a bacteriological condition that must be reckoned with in soil study. Upon its significance we are by no means ready to pronounce.

F. L. Stevens,
W. A. Withers
North Carolina Agricultural Experiment Station,
West Raleigh, N. C.,
December 8, 1908

The American Association for the Advancement of Science

Anthropology at the Baltimore Meeting

The joint meeting of Section H of the American Association and the American Folk-Lore Society was held at the Maryland Institute, Baltimore, December 28–31, 1908.

Meetings of the Sectional Committee

In the absence of Professor R. S. Woodworth, vice-president of the section, Professor Boas, retiring vice-president, acted as chairman of the sectional committee. Officers of the Baltimore meeting were nominated as follows:

Member of the Council—B. T. B. Hyde.

Member of the General Committee—G. G. MacCurdy.

Sectional offices were filled by the nomination of Professor William H. Holmes, Washington, D. C., as vice-president for the ensuing year; Dr. George Grant MacCurdy, New Haven, Conn., secretary for five years; and Dr. Geo. A. Dorsey, member of the sectional committee, to serve five years. These candidates were later elected by the association in general committee. Professor W. H. Holmes was also elected president and Dr. George Grant MacCurdy reelected secretary of the American Anthropological Association, the proceedings of which are printed in the *American Anthropologist* for January–March, 1909.

Addresses and Papers

The address of the retiring vice-president, Professor Franz Boas, was on "Race Problems in America." "The Mythology of the Central and